

DRAFT HEALTH ADVISORY:

SAFE EATING GUIDELINES FOR FISH FROM LAKE SONOMA (SONOMA COUNTY) AND LAKE MENDOCINO (MENDOCINO COUNTY)

August 2006

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EXECUTIVE SUMMARY

The North Coast Regional Water Quality Control Board (NCRWQCB) requested that samples of fish from lakes Sonoma and Mendocino (among other water bodies in the region) be collected and analyzed for trace metals, and in some cases, chlorinated hydrocarbon contaminants including pesticides and PCBs (polychlorinated biphenyls) as part of a statewide water quality-monitoring program. This program, formerly the Toxic Substances Monitoring Program, is now part of the Surface Water Ambient Monitoring Program (SWAMP). The Office of Environmental Health Hazard Assessment (OEHHA), of the California Environmental Protection Agency, developed a sampling plan and assisted in the collection of additional fish samples to augment the historical dataset for these lakes, and evaluated the data to determine whether there may be potential adverse health effects associated with the consumption of sport fish from these lakes. Data indicated that, in some fish species in these lakes, concentrations of mercury have accumulated in fish tissues to levels that pose a concern for public health. As a result, OEHHA developed fish consumption guidelines for Lake Sonoma and Lake Mendocino as described in this report.

Mercury is a trace metal that can be toxic to humans and other organisms. Mercury occurs naturally in the environment, and is also redistributed as a result of human activities such as mining and the burning of fossil fuels. Once mercury is released into the environment, it cycles through land, air, and water. In aquatic systems, it undergoes chemical transformation to the more toxic organic form, methylmercury, which accumulates in fish and other organisms. More than 95 percent of the mercury found in fish occurs as methylmercury, which is a highly toxic form of the element. Almost all fish contain detectable levels of mercury, as methylmercury. Consumption of fish is the major route of exposure to methylmercury in the United States. For more information on mercury, see Appendix I.

The critical target of methylmercury toxicity is the nervous system, particularly in developing organisms such as the fetus and young children. Significant methylmercury toxicity can occur to the fetus during pregnancy even in the absence of symptoms in the mother. In 1985, the United States Environmental Protection Agency (U.S. EPA) set a reference dose (that is the daily exposure likely to be without significant risks of deleterious effects during a lifetime) for methylmercury of 3×10^{-4} milligrams per kilogram of body weight per day (mg/kg-day), based on central nervous system effects (ataxia, or loss of muscular coordination; and paresthesia, a sensation of numbness and tingling) in adults. This reference dose (RfD) was lowered to 1×10^{-4} mg/kg-day in 1995 (and confirmed in 2001), based on developmental neurologic abnormalities in infants exposed *in utero*. Because OEHHA finds convincing evidence that the fetus is more sensitive than adults to the neurotoxic effects of mercury, but also recognizes that fish can play an important role in a healthy diet, OEHHA chooses to use both the current and previous U.S. EPA reference doses for two distinct population groups. In this advisory, the current RfD based on effects in infants will be used for women of childbearing age and children aged 17 years and younger. The previous RfD, based on effects in adults, will be used for women beyond their childbearing years and men.

Mercury concentrations in the fish were compared to guidance tissue levels for methylmercury, which are designed so that individuals consuming no more than a preset number of meals should not exceed the reference dose for this chemical. Evaluation of data and comparison with guidance tissue levels for methylmercury indicated that fish consumption guidelines were appropriate for Lake Sonoma and Lake Mendocino. Fish consumption guidelines provide information to fish consumers as to which fish species have high mercury levels and whose consumption should be

restricted or avoided altogether, as well as other fish species that are lower in mercury (or other contaminants) that could be consumed more frequently. A statistically representative sample size was available to provide guidelines for largemouth bass, redear sunfish, and black crappie from Lake Sonoma; and for largemouth bass and redear sunfish from Lake Mendocino. Supporting data (such as mercury concentration for a closely related species at a similar trophic level) were used to develop additional consumption guidelines for other sport fish species as appropriate.

All individuals, especially women of childbearing age and children aged 17 years and younger, are advised to follow the consumption guidelines in order to keep fish part of a healthy diet while ensuring that methylmercury ingestion does not exceed the reference dose. To help sport fish consumers achieve this goal, OEHHA has developed the advice contained in this report for fish collected from lakes Sonoma and Mendocino.

For general advice on how to limit your exposure to chemical contaminants in sport fish (*e.g.*, eating smaller fish of legal size), see the California Sport Fish Consumption Advisories (<http://www.oehha.ca.gov/fish.html>) or Appendix II. Site-specific advice for other California water bodies can be found online at: http://www.oehha.ca.gov/fish/so_cal/index.html. It should be noted that, unlike the case for many fat-soluble organic contaminants, various cooking and cleaning techniques will not reduce the methylmercury content of fish.

SAFE EATING GUIDELINES

FISH CONSUMPTION FROM LAKE SONOMA

Fish are nutritious and should be part of a healthy, balanced diet. It is important, however, to choose your fish wisely. The American Heart Association recommends healthy adults eat at least two meals of fish a week. OEHHA recommends that you choose fish to eat that are lower in mercury. Because some types of fish from Lake Sonoma contain high levels of mercury, OEHHA provides the recommendations below that you can follow to reduce the risks from exposure to methylmercury in fish.



Women of childbearing age, pregnant or breastfeeding women, and children 17 years and younger

EAT IN MODERATION No more than 1 meal a week
Sunfish or crappie
AVOID No more than 1 meal a month
Largemouth or smallmouth bass



Women beyond childbearing age and men

BEST CHOICES Up to 2 meals a week
Sunfish or crappie
EAT IN MODERATION No more than 1 meal a week
Largemouth or smallmouth bass

- **CONTACT WITH THE WATER IS SAFE.**
- **EAT SMALLER FISH OF LEGAL SIZE.** Fish build up mercury in their bodies as they grow.
- **MEAL SIZE DEPENDS ON BODY WEIGHT.** Meals are based on a 160-pound adult eating 8 ounces of fish (6 ounces after cooking) — about the size of two decks of cards. If you weigh less than 160 pounds, eat smaller portions of fish. Serve smaller meals to children.
- **DO NOT COMBINE FISH CONSUMPTION ADVICE.** Do not eat more than one of the listed fish species during the same time period unless you are eating from the Best Choices (green) category. If you eat fish from one place, following the advisory, avoid eating fish from other sources during the same time period.
- **CONSIDER THE FISH YOU BUY FROM STORES AND RESTAURANTS.** Women of childbearing age and children can safely eat up to 2 meals a week of most fish purchased in a store or restaurant, **OR** use this guide for eating fish caught from this water body. In a week when you eat 2 meals of fish purchased from stores or restaurants, avoid eating fish caught from a local water body. Commercial fish such as shrimp, king crab, scallops, farmed catfish, wild ocean salmon, oysters, tilapia, flounder, and sole generally contain some of the lowest levels of mercury. Women of childbearing age and children should not eat shark or swordfish, which contain the most mercury.
- **FISH FROM OTHER WATER BODIES MAY ALSO CONTAIN MERCURY.** Not all water bodies in California have been tested. With the exception of ocean or river-run salmon or steelhead, which may be consumed more frequently, fish caught from places without an advisory should be eaten in limited amounts.

SAFE EATING GUIDELINES

FISH CONSUMPTION FROM LAKE MENDOCINO

Fish are nutritious and should be part of a healthy, balanced diet. It is important, however, to choose your fish wisely. The American Heart Association recommends healthy adults eat at least two meals of fish a week. OEHHA recommends that you choose fish to eat that are lower in mercury. Because some types of fish from Lake Mendocino contain high levels of mercury, OEHHA provides the recommendations below that you can follow to reduce the risks from exposure to methylmercury in fish.



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Women beyond childbearing age and men

BEST CHOICES Up to 2 meals a week
Sunfish or crappie
EAT IN MODERATION No more than 1 meal a week
Largemouth or smallmouth bass

- Incomplete information from Lake Mendocino indicates that you should avoid eating striped bass, and channel catfish should be eaten in limited amounts (no more than 1 meal a week).
- **CONTACT WITH THE WATER IS SAFE.**
- **EAT SMALLER FISH OF LEGAL SIZE.** Fish build up mercury in their bodies as they grow.
- **MEAL SIZE DEPENDS ON BODY WEIGHT.** Meals are based on a 160-pound adult eating 8 ounces of fish (6 ounces after cooking) — about the size of two decks of cards. If you weigh less than 160 pounds, eat smaller portions of fish. Serve smaller meals to children.
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